Name of Researcher: Miss. Pawar Pratibha Devising

Phone No: 7774992671

Email: ppratibha9421@gmail.com

Category: VJNT

Subject: Zoology

Research Topic: Studies on Haematological investigation, Body mass index and early age menarche, Problems and Challenges of Tribal Adolescents of Tribal boarding schools from Nanded District Maharashtra, India.

Research Guide: Dr. Jayshree U. Deshmukh

Professor,

PG Department of Zoology,

Pratibha Niketan College,

Nanded- 431605

Phone no: 9403854442

Email: deshmukh.jayashri@gmail.com

Research center: PG Department of Zoology

N.E.S. Science college, Nanded- 431605

A Studies on Haematology investigation, Body mass Index and early age menarche Problems and Challenges of Tribal Adolescents of Tribal boarding schools from Nanded District, Maharashtra, India

Summary

The present research work aims to investigate the haematology status, body mass index, early age menarche of tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India. The study will explore the impact of the residential school environment on the overall health and fitness of tribal children, with a focus on parameters such as hemoglobin levels, red blood cell count, white blood cell count, packed cell volume, mean corpuscular volume, and mean corpuscular hemoglobin concentration. Additionally, the study will assess the body mass index of the participants to gain a comprehensive understanding of their physical health and fitness. Tribal communities in India often face socioeconomic challenges that can impact their access to quality education and healthcare. Residential schools, designed to provide education and boarding facilities, may play a crucial role in addressing these disparities. However, the impact of the residential school environment on the health and fitness of tribal adolescents remains poorly understood. Existing literature suggests that tribal populations in India are more vulnerable to undernutrition, micronutrient deficiencies, and related health issues compared to their non-tribal counterparts. This study seeks to fill this research gap by providing empirical evidence on the haematological, anthropometric, and fitness parameters of tribal adolescents in residential schools.

Introduction

Adolescence, the transitional phase between childhood and adulthood, is a remarkable period in the human lifespan marked by profound physical, cognitive, and socioemotional transformations. This phase, typically spanning the ages of 13 to 18 (WHO, 2006) is characterized by a rapid increase in height and weight, hormonal changes that drive sexual maturation, and wide swings of emotion as individuals navigate the path to independence and adulthood. (Baheiraei et al., 2014) (Zachry, 1944). Adolescents in India comprise around 21% of the total population, and the sex ratio in this age group is 898. (WHO, 2006, Government of India. Census of India; 2011). Among teenage girls, anemia is a common medical condition. Low mean hemoglobin levels and low nutritional intake of proteins, calories, and macro/ micronutrients among adolescent girls and expectant mothers have been reported by UNICEF and the 1992 ICMR study on iron and folic acid supplementation. Stunting and poor physical growth are the first signs of insufficient nutrition. According to the NFHS-3, adolescents (ages 15 to 19) had the highest frequency of anemia (56%) when compared to other groups of women in reproductive age. (International Institute for Population. 2014). The Department of Health and Family Welfare at the state level and the Ministry of Health and Family Welfare at the federal level handle health issues pertaining to adolescents.

Menarche, the first menstrual period, typically occurs between the ages of 11 & 14, but can happen as early as 9 or as late as 15. Early menarche can be associated with a no. of health issues and psychosocial Problems Including:

Cancer: women who experience menarche before age 12 have a 23% higher risk of developing breast cancer than those who first menstruate at age 15 or later. They also have a 40% higher risk of endometrical cancer and a 17% higher risk of ovarian cancer.

Cardiovascular Disease: Early menarche is associated with an increased risk of cardiovascular diseases such as hypertension, coronary heart disease, stroke and diabetes.

Metabolic Syndrome: Hypertension, Insulin resistance.

Psychosocial Problems: Early menarche is associated with psychosocial problems such as anxiety, depression, sub use, and suicidal behavior.

Shorter Hight: Early menarche can cause early Fusion of the epiphyseal growth plates, which can result in a shorter find adult height. Many factors can influence when menarche begins including: chromosomes 6 has been associated with earlier menarche.

Socioeconomic and environmental factors: race BMI nutritional habits and exercise can all influence menarcheal age.

Exposure to endocrine-disrupting chemical: chemicals found in plastic container and bottles pesticides and other environmental sources can interfere with the normal function of the endocrine system and disrupt hormonal balance.

The health and well-being of adolescents has garnered increasing global attention in recent years, as this period presents unique challenges and opportunities. Adolescence is a time of heightened curiosity, increasing autonomy from family, and a greater desire for privacy, which can lead to many of their physical, psychological, and social concerns remaining unknown to their families. (Baheiraei et al., 2014) The rapid and uneven development during this phase is responsible for the significant stresses and strains experienced by adolescents, even in the most favorable environmental conditions. (Zachry, 1944)

Adolescence is a critical neurobiological period for the development of higher- order cognition, such as working memory, response inhibition, and performance monitoring, which are essential for successfully navigating the transition to adult roles and responsibilities. However, this period is also marked by a peak in sensors seeking behavior, which can create vulnerability to risk-taking and increased mortality rates. (Larsen & Luna, 2018)

The cognitive and affective development that occurs during adolescence is a complex interplay between the maturation of brain, behavioral, and cognitive systems. The prevalence of obesity and undernutrition among adolescents in India, particularly in rural and tribal areas, is a significant public health concern (Pathak et al., 2018). Due to their lack of access to basic healthcare facilities, many studies indicate that undernutrition is a concern in India's rural and tribal areas (Joshi et al., 2014, Venkaiah et al., 2002). According to studies, teenagers in rural areas are particularly likely to suffer from undernutrition (Joshi et al., 2014, Patanwar et al., 2013). Residential schools serving tribal populations play a crucial role in providing education and other support services to these underprivileged communities. However, the impact of the residential school environment on the overall health and fitness of tribal adolescents remains understudied. The purpose of this research work is to examine the haematological profile, body mass index, early age menarche of tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India.

Review of Literature

International Status

Numerous studies have investigated the health and fitness of adolescents in various settings, including residential schools. These studies have highlighted the prevalence of both undernutrition and overweight/obesity among school-going adolescents, with significant variations observed between urban and rural populations. Additionally, research has explored the impact of air pollution on the hematological profile of school-going children. (Das & Chatterjee, 2015)

A study conducted in India found that 17.6% of urban and rural school-going adolescents were obese, while 20.2% were overweight, 59% were normal, and 3.2% were underweight (Pathak et al., 2018). Another investigation in India reported that the intake of most food groups was lower than the suggested levels among rural and tribal women, leading to micronutrient deficiencies during pregnancy and lactation. (Rao et al., 2010)

A study on school-going boys in West Bengal, India, examined the effects of haematological profile in areas with different air pollution levels. The researchers found that participants from the area with higher air pollution levels had lower and altered hematological parameters compared to those from the area with lower air pollution levels.

National Status

In India, several studies have explored the nutritional status and health-related parameters of tribal populations, including those residing in residential schools. These studies have highlighted the vulnerability of tribal communities to undernutrition, communicable diseases, and poor access to healthcare. Existing literature suggests that tribal populations in India are more vulnerable to undernutrition, micronutrient deficiencies, and related health issues compared to their non-tribal counterparts (Rao et al., 2010).

A study on the tribal population in India reported that their life expectancy is lower than the general population (63.9 years vs. 67 years), and they have a higher incidence of communicable, vector-borne, and waterborne diseases. Additionally, tribal women have less access to antenatal and postnatal care, contributing to a disproportionately large proportion of maternal deaths in some states.

Significance

The proposed research work has the following significance:

1. It will contribute to the limited existing literature on the health and fitness status of tribal adolescents in India, particularly those studying in residential schools.

2. The findings from this study can inform the development of policies and programs aimed at improving the overall health and well-being of tribal adolescents in India.

3. The insights gained from this research can help guide the design and implementation of targeted interventions to address any identified deficiencies in hematological profile, body mass index, early age menarche among tribal adolescents.

Another investigation on the diet and nutritional status of tribal and rural women in India revealed inadequate dietary intake, especially of micronutrients, during pregnancy and lactation. The study also found a higher prevalence of goiter among tribal women compared to their rural counterparts.

Importance of the study

International Importance

The proposed research work will contribute to the growing body of knowledge on the health and fitness of adolescents, especially those from underprivileged tribal communities, in residential school settings. The study's findings may have broader implications for the design and implementation of targeted interventions to improve the overall well-being of tribal adolescents in India and other developing countries with similar socioeconomic and cultural contexts.

National Importance

The study's focus on tribal adolescents in residential schools aligns with the national priority to address the health and educational needs of marginalized communities in India. The research findings can inform policymakers and healthcare providers to develop evidence-based strategies and programs aimed at enhancing the nutritional status, physical fitness, and overall health of tribal students in residential schools.

While several studies have explored the health and nutritional status of tribal populations in India, including those residing in residential schools, there is a paucity of research specifically examining the hematological. profile, body mass index, early age menarche of tribal adolescents in these educational institutions.

Research gap

The existing literature on the health and fitness of tribal adolescents in India is limited, with a focus on specific aspects such as nutritional status or prevalence of communicable diseases. There is a need for a comprehensive study that examines the hematological profile, body mass index of tribal adolescents studying in residential schools, as these parameters provide a holistic understanding of their overall health and fitness.

This research work aims to fill this gap by investigating the aforementioned health and fitness parameters among tribal adolescents in the Nanded district of Maharashtra, India.

Scope of the Study

The proposed research work will be conducted in the Nanded district of Maharashtra, India and will focus on tribal adolescents studying in residential schools. The study will investigate the following aspects:

- Haematological profile: Hemoglobin levels, red blood cell count, white blood cell count, packed cell volume, mean corpuscular volume, and mean corpuscular hemoglobin concentration.
- Body Mass Index: Assessment of height, weight, and calculated BMI.
- The study will involve a cross-sectional survey of tribal adolescents aged 13 to 18 years studying in residential schools in the Nanded district.

Objectives of Research Work

1) To assess the haematological profile of tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India.

2) To evaluate the body mass index of tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India.

3) To examine the relationship between haematological profile, body mass index, early age menarche among tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India.

4) To provide an idea of quality of life to tribal adolescent girls by improving their environment, dietary pattern, media exposure and psychological stress.

5) To study the mean age of menarche, to find out the BMI, Hb, correlation of nutrition in the terms of BMI with age of menarche studying in residential schools in the Nanded district of Maharashtra, India.

Hypothesis

H1: Tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India, will have a lower haematological profile, body mass index, early age menarche compared to the recommended standards.

H2: There will be a positive correlation between haematological profile, body mass index, early age menarche among tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India.

Materials and Methods

Study Design and Setting: This study will employ a cross-sectional survey design. The research will be conducted in residential schools located in the Nanded district of Maharashtra, India, which has a significant population of tribal communities.

Participants: The study population will comprise tribal adolescents aged 13 to 18 years studying in residential schools in the Nanded district of Maharashtra, India.

Sampling Methods: Participants will be selected using a stratified random sampling technique, ensuring representation from different tribal communities and age groups.

Ethical Approval: Ethical approval will be taken from the university Ethical Committee. The study conformed to the standards set by the Declaration of Helsinki. Written informed consent will be obtaining from all of the children and their parents. The subjects' volunteers to participate in the study and are free to withdraw at any time without any need to provide a reason.

Tools used: Questionnaire for adolescent students.
Interview guide for teachers.

Data Collection

1. **Haematological Profile*:*** Venous blood samples will be collected from each participant, and the following parameters will be analyzed using standard laboratory protocals: hemoglobin levels, red blood cell count, white blood cell count, packed cell volume, mean corpuscular volume, and mean corpuscular hemoglobin concentration.
2. **Body Mass Index:** Height and weight of each participant will be measured, and the body mass index will be calculated using weight in kilograms divided by the square of the height in meters (kg/m^2). A value of BMI < 18.5 kg/m^2 will be consider as underweight, 18.5–24.9 kg/m^2 will be consider as normal weight, 25.0–29.9 kg/m^2 will be consider as pre-obese (overweight), and BMI $\geqslant$ 30 will considered as obese (Maton and Bakalian, 1993; Zuckerman, 2007, WHO, 1995).

Data Analysis

Descriptive statistics will be used to summarize the haematological profile, body mass index, early age menarche of the participants. Inferential statistics, such as t-tests and Pearson's correlation, will be used to examine the relationship between the study variables and test the hypotheses.

All statistical analyses will be performed using SPSS software, and a significance level of $p < 0.05$ will be considered.

Limitations

1. The study is limited to tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India, and the findings may not be generalizable to other geographical regions or nontribal populations.
2. The cross-sectional design of the study precludes the establishment of causal relationships between the study variables.

Expected Outcomes

The proposed research work is expected to contribute to the understanding of the health and fitness status of tribal adolescents studying in residential schools in the Nanded district of Maharashtra, India. The findings from this study may:

1. Provide insights into the haematological profile, body mass index, early age menarche of tribal adolescents, which can inform the development of targeted interventions to address any identified deficiencies.
2. Establish the relationship between haematological profile, body mass index, early age menarche which can facilitate a holistic approach to the assessment and promotion of health and fitness among tribal adolescents.

Proposed Work Plan and Tentative Chapter Scheme

Chapter 1: Introduction

1.1. Background

1.2. Purpose of the research work

1.3. Significance of the study

Chapter 2: Review of Literature

2.1. International status

2.2. National status

Chapter 3: Materials and Methods

3.1. Study design and setting

3.2. Participants

3.3. Measurements

- Haematological profile
- Body Mass Index

3.4 Data analysis

Chapter 4: Results and Discussion

4.1 Haematological profile of tribal adolescents

4.2 Body Mass Index of tribal adolescents

4.3 Relationship between study variables

Chapter 5: Conclusion and Recommendations

5.1. Key findings

5.2. Implications and recommendations

References

- Asrullah, M., L'Hoir, M., Feskens, E. J. M., & Melse-Boonstra, A. (2022). Trend in age at menarche and its association with body weight, body mass index and non-communicable disease prevalence in Indonesia: evidence from the Indonesian Family Life Survey (IFLS). *BMC Public Health*, *22*(1). https://doi.org/10.1186/s12889-022-12995-3

- Baheiraei, A., Khoori, E., Ahmadi, F., Foroushani, A. R., & Ghofranipour, F. (2014). Health Concerns of Iranian Adolescents: Protocol for a Mixed Methods Study. In Iranian Red Crescent Medical Journal (Vol. 16, Issue 6). Kowsar Publishing Company https://doi.org/10.5812/ircmj.6715

- Das, P., & Chatterjee, P. (2015). Aerobic capacity and hematological response to exercise: A study on school- going regularly exercising boys in two different air pollution zones. In Journal of Exercise Science & Fitness (Vol. 13, Issue 2, p. 99). Elsevier BV. https://doi.org/10.1016/j.jesf.2015.08.00

- De Oliveira, M. H., da Costa, R. F., Fisberg, M., Kruel, L. F. M., & Conde, W. L. (2024). Comparison of international height and BMI-for-age growth references and their correlation with adiposity in Brazilian schoolchildren. *British Journal of Nutrition*, *131*(10), 1699-1708.

- Ferreira H. D. S. (2020). Anthropometric assessment of children's nutritional status: a new approach based on an adaptation of Waterlow's classification. *BMC pediatrics*, *20*(1), 65. https://doi.org/10.1186/s12887-020-1940-6

- Government of India. Census of India; 2011. http://www.censusindia.gov.

- Government of India. Primary Census Abstract – Data Highlights Census of India; 2011. in/2011census/PCA/PCA_Highlights/pca_highlights_file/India/Chapter-1.pdf. http://www.censusindia.gov.

- Joshi SM, Swarna L, Agarwal SS, Mishra MK, Umashankar S. (2014). Study of nutritional status of adolescent girls in rural area of Bhopal district. *J Community Med* (Vol. 5, Issue 4 p.191).
- Larsen, B., & Luna, B. (2018). Adolescence as a neurobiological critical period for the development of higher-order cognition [Review of Adolescence as a neurobiological critical period for the development of higher-order cognition]. Neuroscience & Biobehavioral Reviews, 94, 179. Elsevier BV. https://doi.org/10.1016/j.neubiorev.2018.09.005
- Maton, A., Hopkins, J., McLaughlin, C. W., Johnson, S., Warner, M. Q., LaHart, D., & Wright, J. D. Human Biology and Health (1993). *Englewood Cliffs, New Jersey, US: Prentice Hall*.
- Mishra, G. D., Cooper, R., Tom, S. E., & Kuh, D. (2009). Early life circumstances and their impact on menarche and menopause. *Women's Health*, *5*(2), 175-190.
- Nutrition, W. A. (2006). a review of the situation in selected south-east Asian countries. *WHO: New Delhi, India*
- Patanwar P, Sharma K, Gour H. Nutritional status of Kurmi adolescent girls of Raipur. Int J Sci Res Publ., 2013;3:1-6.
- Pathak, S., Modi, P., Labana, U., Khimyani, P., Joshi, A., Jadeja, R., & Pandya, M. (2018). Prevalence of obesity among urban and rural school going adolescents of Vadodara, India: a comparative study. In International Journal of Contemporary Pediatrics (Vol. 5, Issue 4, p. 1355). Medip Academy. https://doi.org/10.18203/2349-3291.ijcp20182480
- Rao, K. M., Balakrishna, N., Arlappa, N., Laxmaiah, A., & Brahmam, G. N. V. (2010). Diet and Nutritional Status of Women in India. In Journal of Human Ecology (Vol. 29, Issue 3, p. 165). Kamla Raj Enterprises. https://doi.org/10.1080/09709274.2010.11906259.
- Venkaiah, K., Damayanti, K., Nayak, M. U., & Vijayaraghavan, K. (2002). Diet and nutritional status of rural adolescents in India. *European journal of clinical nutrition*, *56*(11), 1119-1125.
- World Health Organization, Growth Standards: anthropometric assessment of

growth. Criteria 858, WHO, Geneva (1995)

- Zachry, C. B. (1944). Customary Stresses and Strains of Adolescence. The ANNALS of the American Academy of Political and Social Science, 236(1), 136-144. https://doi.org/10.1177/000271624423600118.
- Zuckerman, K. (2007). Approach to the anemias. *Goldman L, Ausiello D, eritors. Cecil Medicine. 23rd ed. Philadelphia: Saunders Elsevier*.

Research Scholar

Pratibha D. Pawar

Research guide

Dr. Jayashree U. Deshmukh